SUBSTITUTE SPECIFICATION

TITLE OF THE INVENTION

PORTABLE TERMINAL

FIELD OF THE INVENTION

This invention relates to a portable terminal, such as, for example, a portable telephone, PHS, PDA (Personal Digital Assistant), PCS (Personal Communication Service), PC (Personal Computer) and on the like.

BACKGROUND OF THE INVENTION

In recent years, a foldable portable terminal has been developed, in which, in addition to an LCD (main liquid crystal) which is formed on a front surface of the housing, an LCD (sub liquid crystal), which is usable even in a folded state, is formed on the back surface thereof. The front surface of the portable terminal is a surface which is exposed when the foldable portable telephone is open state, and the back surface thereof is a surface which is exposed when the portable terminal is in the folded state (closed state), being a surface on the opposite side from the front surface.

As publicly known examples of a foldable portable terminal, JP-A-2000-253113 gazette and JP-A-2002-111816 gazette can be cited.

JP-A-2000-253113 gazette discloses terminal a structure in which, in addition to the main liquid crystal display which is formed on the front surface of the terminal device, a see-through liquid crystal display is disposed in another housing, so that, even when the portable terminal is in a folded state, information displayed on the main liquid

crystal display can be viewed through the see-through liquid crystal display. Also, in order to realize a predetermined operation when the portable terminal is in a folded state, a shutter key, a mode switching key, and a menu key are disposed on the housing.

Also, in the portable telephone disclosed in JP-A-2002-111816 gazette, in order to enable an audio operation when the portable telephone is in the folded state, the portable telephone has an operation key that is disposed so as to be usable when the portable telephone is in a folded state along with the sub liquid crystal display.

On the other hand, JP-A-2001-186396 gazette discloses a terminal structure in which liquid crystal display parts are formed on both a front surface and a back surface of the portable terminal, but only a main liquid crystal display is provided on the front surface. Thus, in order to make it possible to view the main liquid crystal display formed on the front surface even when the portable terminal is folded, the housings are hinged so as to be foldable also toward an opposite side to the normally folded side to allow the main liquid crystal display to be exposed even when the terminal is in the folded state.

In the same manner, JP-A-2001-320463 gazette discloses a structure in which the main liquid crystal display is exposed even when the portable terminal is in the folded state, by effecting 180 degree rotation of the housing thereof around a hinge part in the horizontal direction, on the front surface of which, the main liquid crystal display panel is formed.

SUMMARY OF THE INVENTION

However, in the portable terminal disclosed in JP-A-2000-253113 gazette, a

predetermined function can be utilized when the terminal is in a folded state, but as to keys which are formed on the back surface thereof, such as the shutter key, the mode switching key and so on, these keys are disposed in a mixed manner, so that the usability of a camera operation when the portable terminal is in a closed state has not been studied sufficiently. For example, in case of operating the shutter key, there is a possibility that the mode switching key will be mistakenly operated. Also, the mode switching key is a key which is not necessary to be operated in the middle of the camera operation; and so, because of the existence of such key, it is necessary for a user to remember too much, or to make too many judgments, as to which key is for which function, whereby the usability is not sufficient.

Also, in the portable terminal disclosed in JP-A-2002-111816 gazette, a user can listen to music and so on when the portable terminal is in the closed state, but there is no description regarding a camera operation in the closed state, and studies of the arrangement and usability of operation keys at the time of camera operation and so on were not sufficient.

Also, JP-A-2001-186396 gazette and JP-A-2001-320463 gazette both disclose a structure which is usable in a state in which the main liquid crystal display formed on the front surface is exposed when the portable terminal is in the folded state, but this simply relates to the use of the main liquid crystal display and does not relate to a sub liquid crystal display which is formed on the back surface. Also, in the case of these portable terminals, in order to have the main liquid crystal exposed, unlike the folded state in which the portable terminal is normally carried around (the folded (closed) state in this embodiment), there was a necessity to take the trouble to have the housing reversed or

rotated.

In this manner, in any one of publicly known examples, a sufficient study has not been carried out as to the usability of the camera operation when the portable terminal is in the closed state, in a foldable portable telephone having display parts on both the front and back surfaces thereof. In particular, a sufficient study has not been conducted as to the key layout with good usability in case of operating a camera by gripping a portable telephone in the closed state in such a manner that the hinge part is at an upper side.

Also, a sufficient study has not been conducted as to the usability of the portable terminal on the occasion when it is changed from a closed state to an open state, or from an open state to the closed state.

Also, in any one of the publicly known examples, a sufficient study has not been conducted as to a structure for preventing a wrong operation which may cause a malfunction in case keys are disposed on the back surface of the portable terminal.

A first object of this invention is to realize an improvement in the usability of the portable terminal in the folded state, particularly in the case of a foldable portable telephone. In particular, it is an object to improve the usability of the portable terminal at the time of camera operation.

Also, a second object of the invention is to prevent a wrong operation of an operation key which is formed on the back surface of the portable terminal.

Also, a third object of the invention is to prevent malfunction of an operation key which is formed on the back surface of the portable terminal.

The invention may be configured as described in appended claims, in order to

accomplish the above-described first to third objects.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention, together with further advantages thereof, may best be understood by reference to the following description, taken in conjunction with the accompanying drawings, in which:

Figs. 1(1) to 1(4) provide plan and side views showing a first embodiment of a portable telephone in both open and closed states;

Fig. 2 is a block diagram of the first embodiment;

Fig. 3 is a process flow chart of the first embodiment;

Fig. 4 is a diagram showing a storage format table of pickup image information as used in the first embodiment;

Fig. 5 is a functional flow diagram which shows an example of a display screen of the first embodiment;

Fig. 6 is a process flow chart of a second embodiment;

Fig. 7 is a functional flow diagram which shows an example of a display screen of the second embodiment;

Fig. 8 is a process flow chart of a third embodiment;

Fig. 9 is a functional flow diagram which shows an example of a display screen of the third embodiment;

Figs. 10(1) is a diagram and Figs. 10(2) to 10(4) are process flow charts of a fourth embodiment;

Fig. 11 is a functional flow diagram which shows an example of a display screen

of the fourth embodiment;

Figs. 12(1) and 12(2) are diagrams which show an example of a layout of a sub operation key 107;

Figs. 13(1) and 13(2) are diagrams showing an example of the shape of the sub operation key and a cross-section of the terminal unit, and Fig. 13(3) is a cross-sectional view taken along line y-y in Fig. 13(1);

Fig. 14 is a functional flow diagram which shows an example of display screen transition of a sub display part 104 at the time of a normal state other than a camera mode; and

Figs. 15(1) to 15(3) are diagrams of various types of side surface of a housing.

DETAILED DESCRIPTION OF THE EMBODIMENTS

Hereinafter, various embodiments of this invention will be described with reference to the drawings. In addition, in the drawings, the same reference numerals are used to indicate and identify the same structural parts.

Figs. 1(1) to 1(4) show a conspectus view of a portable telephone which represents this embodiment (first embodiment), and Fig. 2 is a structural block diagram of the portable telephone according to this embodiment. More particularly, Fig. 1(1) shows a front view of the housing as it appears when the portable telephone is in the open state; Fig. 1(2) shows a view of the housing in the open state as seen from the back surface thereof; Fig. 1(3) shows a side view of the housing as it appears when the portable telephone is in a folded state; and Fig. 1(4) shows a back view of the housing in the folded state.

Here, in this embodiment, the illustrated directions of left and right, as well as up and down, are defined when viewing the portable terminal from a front surface thereof, as shown in Fig. 1(1). Also, the front surface of the housing, which configures the portable telephone in this specification, is defined to be that surface which is in a range of vision when the portable telephone is in the open state, as shown in Fig. 1(1); a back surface thereof is defined to be that surface which is in a range of vision when the portable telephone is in the open state, as shown in Fig. 1(2); and a side surface thereof is defined to be that surface which is in a range of vision other than the above-described ones.

In this regard, however, in a current portable telephone, a streamline shaped housing is adopted, and so there are quite a large number of portable telephones in which a boundary line between the front surface, the back surface and the side surface is not clear. For example, as shown in Fig. 15(1), in a portable telephone in which the side surface is disposed at approximately 90 degrees to a reference or base surface, by the above-described definitions, it is easy to distinguish between the front surface and the back surface, on the one hand, and the side surface, on the other hand, in the open state of the portable telephone. However, as shown in Fig. 15(2), when there is no distinct surface which is disposed approximately 90 degrees to the reference surface is not clear, all surfaces can be viewed from the front surface and the back surface, so that, a boundary line between the front surface and the back surface is not clear.

In this connection, even in a case as described above, if it is indicated that an operation key is disposed so as to straddle a joint part joining an upper side member and a lower side member of a housing (e.g., an operation key B of Fig. 15(2)), even if

the operation key can be viewed from the front surface or the back surface, it is deemed to be disposed on the side surface.

Also, as shown in Fig. 15(3), which shows a cross sectional view wherein a housing 200 is cut along a line x-x parallel to a hinge part 300, as seen in Fig. 1(1), even in the case of an operation key which can be viewed from aback surface of the housing 200 and is disposed at a position which does not straddle the above-described joint part, it has been determined that, if an angle (α) which is formed by a normal line direction of a located position of the operation key relative to a housing surface and a vertical direction in a grounded state of the portable telephone is 45 degrees and more, the operation key is deemed to be disposed on a side surface. That is, based upon whether the position of the operation key is closer to either the back surface or the side surfacedetermines whether it is disposed on the back surface or on the side surface.

On the other hand, if it is possible to consider that the housings 200, 201 constitute an approximately 6 face piece, the front surface, the back surface and the side surface may be defined on the basis of an approximately 6 face piece.

In addition, in each case, in the state of use wherein the housing is being held, for example, whether it is a range where an operation key is operable by use of the thumb, or whether it is in a range which makes it difficult to be mistakenly operated, becomes a standard for determining a boundary line of each surface.

Now, the portable telephone shown in Figs. 1(1) to 1(4) and 2, which exhibits an improved usability the device is used in the folded state, will be described. The portable telephone of this embodiment has two housings 200 and 201, which can be moved to open and closed states, and an image pickup part, for example, an image pickup

camera 109. These housings 200 and 201 are joined so that they can be folded around an X-X axis as a turning axis, and, for this purpose, they are connected to each other at a hinge part 300.

The housing 200 has a speaker 112 which outputs sound at the time of telephone communication and a main display part 103 which produces a main display; and, it has, on a back surface, opposite to the main display part 103, a sub display part 104 which produces a simplified display. There is also a sub operation key 107 (in Fig. 1(2), 107a and 107b) on the back surface. Here, the main display part 103 displays are not only the operating states, such as the power state, the electromagnetic wave strength, the power, the server connection state, unread mail and so on, of the portable telephone, but also received data, such as the telephone number inputted, a mail address, mail sending text and soon, as well as a motion picture and a still picture, a telephone number of a caller at the time when an incoming call was received, received mail text, a screen of Internet connected data and so on. On the other hand, sub display part 104 displays the operating states of the portable telephone; and, for example, icons are displayed which show the power state, athe electromagnetic wave strength, the power, a server connection state, and unread mail. Also, on the main display part 103 and the sub display part 104, it is possible to display (monitor) information of an image which was picked up by the image pickup camera 109 as a view finder at the time of camera operation.

Also, the back surface has a music speaker 113, which is used for reproducing a melody for signaling an incoming call, and for playing a music file, such as mp3 etc.

On the other hand, the housing 201 has a main operation keyboard 106 by which

a main input operation is carried out, a microphone 111 through which sound is inputted, and a side-mounted mode selection key 105 for switching image pickup modes of the image pick up camera. Here, the main operation keyboard 106 is an input device used for inputting a telephone number and other information; and, when the portable terminal is used as a typical telephone, it is used for inputting the telephone number of the other party, while in the case of sending mail etc., character information etc. is inputted through it.

Also, the mode selection key 105 is, for example, a key that is used for switching between modes, such as a motion picture mode for taking a motion picture, a still picture mode for taking a still picture, a setting mode for carrying out various settings for image pickup, a browsing mode for browsing through pictures which were previously picked up, an edit mode for editing pictures which were previously picked up, and so on. In addition, in this embodiment, a slide key is provided which is slid in upward and downward directions, although a dial type key, such as jog dial etc., may be provided as well. In this regard, the slide key can select the motion picture mode when being slid in the upward direction for a predetermined period of time, and can select the still picture mode when being slid in the downward direction for a predetermined period of time.

Referring to Fig. 2, the CPU 110 operates on the basis of a program which is stored in a memory 102, and it controls each part of the portable telephone in response to an input from the main operation keyboard 106 and the sub operation keys 107. A power supply part 114 is provided in the form of a battery for driving each component part of the portable telephone.

A fold detection part 108 detects the open or closed state of the portable

telephone. In this regard, for example, the housing 200 has a magnet and the housing 201 has a hall-effect device, so that opening and closing states are detected on the basis of a Hi level or a Low level of the voltage value of the hall-effect device to which magnetic fields are applied by the magnet. On the other hand, the fold detection part 108 may be a device which makes use of a sensor or an engagement of a concavity and a convexity, whereby the opening and closing states can be detected.

Also, is the memory 102 stores various data, for example, data of motion pictures and still pictures, and the memory 102 is composed of a volatile memory 102a for storing data temporarily and a non-volatile memory 102b for holding a stored state regardless of the ON/OFF state of the power supply.

Also, there is a communication part 101, and through this communication part 101, it becomes possible to communicate with a switching machine and a server, as well as to perform a GPS (Global Positioning System) function.

In addition, disposed in the approximate center of the hinge part 300, which connects the housing 200 and the housing 201, there is the image pickup camera 109, which can be turned separately from the housings 200 and 201, and by means of this image pickup camera 109, image pickup of a motion picture and a still picture can be carried out.

In the above-described portable telephone, according to this embodiment, it is possible to improve the usability of the portable telephone in the closed state by providing the sub operation key 107 together with the sub display part 104 on the back surface thereof. In particular, it is possible to improve the usability of the device, including the camera operation and so on.

Here, the sub operation key 107, which has been disposed so as to improve the operability of the portable terminal when it is in the closed state, and, in particular, the operability thereof during camera shooting, will be described in more detail.

We conducted a study as to determine for which camera shooting functions an exclusive use key should be provided, on the occasion of carrying out camera shooting when the portable terminal is closed. And, we determined that at least an activation key for activating a camera function, a shutter key for instructing the start of shooting of image information, a zoom adjustment key for adjusting the size of the image information to be taken and a mode selection key for selecting between a motion picture mode or a still picture mode, are needed as exclusive use keys. In addition, although an activation key and a mode selection key are not necessarily required, by providing them as exclusive use keys, it becomes possible to set a camera mode with the portable terminal in a folded state as it is, without opening the portable terminal. On that account, it becomes effective at the time of quick camera shooting and so on.

Next, we studied a layout of these keys. It is fine if each key is usable in the folded state, but it is impossible to secure sufficient operability and usability of the keys simply by disposing them on the same surface.

On one hand, we have considered that, to make use of the sub display part 104 that is formed on the back surface as a view finder when the portable terminal is in the closed state and to operate the portable telephone while holding it in such a manner that the keys can be depressed by the thumb provides stability in case of camera shooting, allowing sufficient usability to be secured; and so, judging from that view point, it becomes desirable to dispose the above-described exclusive use keys on the back

surface of the portable telephone.

However, the portable telephone is normally of a small size and has the sub display part 104 on the back surface so that the region thereof is limited; and, if the above-described four keys are all disposed thereon, one key may come close to another key, causing the size of key itself to be limited, so that it becomes easy to operated the key mistakenly. For example, when the shutter key is intended to be depressed, the activation key or the mode selection key may be mistakenly depressed, as a result of which, the portable telephone undesirably returns to an initial camera shooting state and is switched from the still picture mode to the motion picture mode, so that it becomes impossible to take the image which is intended to be taken.

Therefore, the structure of the portable telephone of this embodiment was designed so that a camera function setting key and an shooting time operation key are disposed without mixing them in the same plane. Here, the camera function setting key is an operation key for conducting setting of the camera function prior to shooting, such as the activation key, the mode selection key and so on. And, the shooting time operation key isa key, such as a zoom key, the shutter key and so on, to be used after the camera function was activated; or, in case that a shooting mode of a motion picture or a still picture can be selected, it serves as an operation key for carrying out the camera operation during a period after the mode was selected until shooting is completed.

Furthermore, on the basis thinking that the camera function setting key is essentially a key which probably will be used only once at the beginning of operation and the shooting time operation key is a key which is handled a number of times during

a period of shooting, we decided to provide the shooting time operation key on the back surface and to dispose the camera function setting key on the side surface. The reason why the shooting time operation key was formed on the back surface is, as described above, that operability on the occasion of utilizing the sub display part 104 formed on the back surface as a view finder is good, and that it is possible to depress (operate) a key stably using the thumb in the state in which the portable telephone is being held. Also, the reason why the camera function setting key was formed on the side surface is, on the occasion of operating the zoom key and the shutter key, to prevent them from being mistakenly operated by the thumb.

In addition, if the shooting time operation key is disposed on the side surface of the housing 200 or the housing 201, the finger used for operating the shooting time operation key differs between the case where the housings are held by the right hand and the case where the housings is held by the left hand (e.g., the thumb is used in case of the right hand, and an index finger is used in case of the left hand); and, therefore, if this key is disposed on the back surface of the housing 200 or the housing 201, it is possible to conduct a similar operation between the situation where the housings are held by the right hand and the situation where the housings are held by the left hand, i.e., operation by the thumb is possible in each case, so that the usability is improved.

The shooting time operation key carries out only a function that has been assigned in advance. It may be formed on the back surface as an exclusive use key; however, taking a series of operations which become necessary at the time of camera operation into consideration, it is configured by use of software such that a key function

is displayed on a sub display screen, and when the key which corresponds to that display is selected, the displayed function is carried out, and it is configured such that the shooting which one wants is completed over changing the screen. In this way, since a key which is formed on the back surface is not restricted to simply one function, even in a normal standby state, other than the time of camera operation, it is possible to realize another function by use of that key. A detailed embodiment thereof will be described later.

As described above, the shooting time operation key, like the sub operation keys 107a and 107b of Fig. 1(4), is disposed on the back surface of the housing 200, and the camera function setting key (the mode selection key 105 seen in Fig. 1(4)) is disposed on the side surface of the housing 201, without interfering with the shooting time operation key; and, thereby, it is possible to prevent a wrong operation in which the camera function setting key, instead of the shooting time operation key, is depressed by mistake. In addition, it is possible to easily operate the keys with the thumb, which is the easiest way to bring the necessary pressure out of the five fingers while stabilizing the housings by supporting them in the palm of the hand. This also makes it possible to conduct camera shooting without blurring, so that the usability is improved.

In addition, the shooting time operation key is a key which is used after the camera function has been activated and a shooting mode, such as a motion picture mode or a still picture mode, has been selected until the shooting is completed. Besides the shutter key, for example, a focus adjustment key for adjusting focus, a shutter speed adjustment key for adjusting shutter speed, a brightness adjustment key for adjusting the brightness of the image information, or a change key for changing the

display screen during a period of camera shooting and so on may be used.

Also, even in a case where the portable terminal is configured to accept an input of the camera function setting key, such as the activation key, the mode selection key and so on, after the camera function has been activated and the shooting mode, such as the motion picture mode, the still picture mode and so on, has been selected until the shooting is completed, it is determined that a key such as the activation key, the mode selection key and so on is not included in the shooting time operation key in this specification.

Also, since there is no problem if the camera function setting key, such as the activation key, the mode selection key and so on, is disposed without interfering with the shooting time operation key, such as the shutter key and so on, for example, the portable terminal may be configured such that, by use of an operation key which is disposed on the front surface of the portable telephone, the camera function is activated or the motion picture mode or the still picture mode is switched, and by use of the sub operation key 107 (shooting time operation key), which is disposed on the back surface, the shooting is conducted.

In the meantime, in accordance with this embodiment, as shown in Fig. 1(4), the portable terminal is configured such that the sub operation key 107 is disposed below the sub display part 104 on the opposite side relative to the hinge part 300 as a standard, and they are used in that physical relationship. That is, the configuration is such that the sub display part 104 is disposed between the sub operation key 107 and the hinge part 300. Also, in this embodiment, display is produced in such a manner that the bottom of an object of shooting in the main display part 103 is located at the hinge

part side, as seen in Fig. 1(1), and the top of the object of shooting in the sub display part 104 is located at the hinge part side, as seen in Fig. 1(4).

Generally, since the main display part 103 and the main operation keyboard 106 in the open of the portable terminal state, as shown in Fig. 1(1), are used in such a physical relationship that the main operation keyboard 106 is disposed below the main display part 103, by setting the physical relationship of the sub display part 104 and the sub operation key 107 in the closed state according to the above-described structure. For example, in a case where, after a predetermined input and so on was carried out with the terminal device in the open state, camera shooting is carried out in the closed state, in case that after camera shooting was carried out in the closed state, a predetermined input and so on is carried out, and so on, it becomes possible to operate the portable terminal without changing the hand which holds the housing 201 (without reversing top and bottom of the housing 201), whereby the operability thereof is improved.

In addition, a structure is known in which an operation key is disposed on an under part of the main display part in the same housing, but in this case, it is necessary to operate with shifting a lower housing upwardly; and, when the operation is carried out while holding the lower housing, it becomes an operation which straddles the hinge part, so that key depression becomes unstable. Also, in case there is a camera located at the hinge part, the camera is likely to be covered by a finger or the hand on the occasion of operating a key, making it difficult to realize an operation of stable camera shooting and so on without changing the hand which holds the housing 201 (without reversing top and bottom of the housing 201), which is mentioned above.

Next, the shape of the sub operation key 107 will be described with reference to Fig. 13(1) to Fig. 13(3). Fig. 13(2) is an enlarged view of the operation key 107, and Fig. 13(3) is a cross sectional view taken along y-y in Fig. 13(1) in which the housing 200 is seen on a plane which is parallel to the hinge part 300.

Here, as shown in Fig. 13(2), a recessed surface of the sub operation key 107 is disposed in such a manner that the sub operation key 107 does not protrude from the back surface of the housing 200. By this design, for example, it is possible to prevent a wrong operation in which the sub operation key 107 is mistakenly depressed in a case where the portable telephone is put into a trousers pocket, a jacket pocket, or a bag and so on.

Also, as shown in Fig. 13(3), the structure is such that, when the recessed surface of the operation key 107 is depressed by a user, a key switch is moved into contact with a substrate, and thereby, an input signal is inputted to CPU 110, to initiate a selection operation and soon which a user wishes to carry out. Here, the recessed surface of the sub operation key 107 refers to a surface which is contacted in case the user depresses the operation key.

Also, as described above, since there is a concern that a wrong operation will occur when the sub operation key 107 is disposed on the back surface, it is desirable to configure this key in such a manner that it is able to be locked to disable actuation thereof. In this case, the CPU 110 may function so as to enable or disable an input from the sub operation key 107 on the basis of a sub operation key enable signal or a sub operation key disable signal, which was inputted through an exclusive use key or a setting screen and so on.

In the same manner, in the portable telephone of this embodiment, camera shooting in the folded state can be carried out through operation of the sub operation key 107, and it is possible to carry out camera shooting in the open state through operation of the main operation key 106. Therefore, to cause the CPU 110 to not accept an input of the sub operation key 107 when the portable terminal is in the open state becomes effective for improving the usability thereof. In this case, the folded state is detected by the fold detection part 108, and, in case the open state is detected, the input of the sub operation key 107 is not accepted. At the same time, the system may be configured so as to turn OFF a display of the sub display part 104 under these circumstances.

On the other hand, it is possible to have the sub display part 104 active for display when the portable terminal is in the open state; however, in this case, it is desirable the reverse the top and bottom of an object of shooting from the way which it is displayed when the portable terminal is in the closed state, while displaying it when the portable terminal is in the open state, so that the relationship between the top and bottom of the object of shooting on the main display part 103 and that on the sub display part 104 are the same. In this case, a folded state of the portable terminal is detected by the fold detection part 108, and the relationship between the top and bottom of an object of shooting, which is displayed on the sub display part 104, is made to differ between that in the open state and that in the closed state.

Next, camera shooting in the closed state of the portable terminal by use of the sub operation keys 107, which was briefly described so far, will be described in more detail. Fig. 3 is a flow chart of this operation, and Fig. 5 shows an example of a display

screen which is displayed on the sub display part 104 during this operation.

In addition, as shown in Fig. 1(2) and Fig. 1(4), it is assumed that there are two sub operation keys 107 (107a, 107b) on the back surface of the housing 200. For example, in a display screen as shown in Fig. 5(2), it is assumed that the key 107a functions to control "ZOOM", as seen at lower left on the screen, and they key 107b functions to control "RECORD", as seen at lower right on the screen. That is, the two functions which are displayed at the lower right side and the lower left side in the sub display part 104, during this operation, are made to correspond to the two (left and right) sub operation keys 107, so that by depressing the right side sub operation key 107b, the function which was displayed at the lower right side in the sub display part 104 is realized, for example.

First, the CPU 110 stores open and closed state information, which was detected by the fold detection part 108, in the volatile memory 102a, for example, "0" in the opened state, and "1" in the closed state. And, the CPU 110 refers to the open and closed state information which was stored in the volatile memory 102a, and it carries out control so as to have the main display part 103 display a predetermined display screen in the case of the open state and to have the sub display part 104 display a predetermined display screen in the case of the closed state.

In this example, it is assumed that the portable terminal is in the closed state, and an idle screen is displayed on the sub display part 104 (S300, Fig. 5(1)).

First, the processing, which is carried out in case the motion picture mode is selected by the mode selection key 105, will be described.

For example, when the mode selection key 105 is slid upward, a camera mode

activation signal and a motion picture mode signal are inputted to the CPU 110, and the CPU 110 activates the camera 109 (S302) and refers to the open and closed state information which was stored in the volatile memory 102a (S303). Then, image information of an image which was taken by the camera 109 is displayed on the sub display part 104 under control of the CPU 110, and a motion picture monitor is started (S304, Fig. 5(2)). On this occasion, on the sub display screen, in addition to the motion picture which is being monitored, ZOOM and RECORD are displayed as functions which can be carried out.

In the foregoing example, a selection of the camera mode activation and the motion picture mode was carried out as one operation, but the invention is not limited to this, and there is no problem if an operation for activating the camera mode and an operation for selecting the motion picture mode are carried out separately.

Next, a user selects whether magnification of the size of the image which is being was displayed on the sub display part 104 is to be adjusted (zoom adjustment) or not (S305). In the case of carrying out zoom adjustment, for example, on a screen of Fig. 5(2), the sub operation key 107a which controls "ZOOM" is depressed, and, on the basis of a sub operation key ID information signal which is inputted from the sub operation key 107a, the CPU 110 changes a set value of the electronic zoom magnification which was stored in a register (not shown) of the camera 109. Next, the CPU 110 counts the adjustment level of the zoom adjustment (S313), and, on the basis of that level, a zoomed display of the image information is carried out (S304). That is, in case that the set value of the electronic zoom magnification was changed, information of an image which was taken by that magnification is displayed on the sub display part

104 under control of the CPU 110 (zoom adjusting method 1).

Also, at this time, the CPU 110 displays a zoom adjustment level on the sub display part 104, for example, it displays "x2", as shown in Fig. 5(10), so as to inform the user of the zoom adjustment level. Also, in this embodiment, it is possible to carry out the zoom adjustment in incremental steps by repeated actuation of the sub operation key 107a, and for example, in case of three steps of zoom adjustment, every time the sub operation key 107a is depressed, the CPU 110 functions to advance the zoom in such a manner that the level eventually returns to a normal level (level 1) following a top level (level 3), like level 1 → level 2 → level 3 →, level 1 —> level 2. In addition, the zoom adjustment may be carried out successively by continuously depressing the sub operation key 107a for a long time, rather than in incremental steps.

Next, in case zoom adjustment is not carried out, or in case motion picture shooting is started after the zoom adjustment has been completed, for example, as seen in a screen of Fig. 5(2), the sub operation key 107b, which controls the function "RECORD", is depressed, and motion picture shooting is started (S306).

In this case, the CPU 110, on the basis of the sub operation key ID information signal which is inputted from the sub operation key 107b, compresses image information of an image which was taken by the camera 109 as motion picture preparation use image data, and it stores the compressed data in the volatile memory 102a. It then displays the information of an image which was taken by the image pickup camera 109 on the sub display part 104 (S307, Fig. 5(3)). Also, the CPU 110 activates the microphone 111, compresses sound data which is outputted from the microphone 111 to CPU 110 as motion picture preparation use sound data, and stores the

compressed data in the volatile memory 102a. On this occasion, during a period in which motion picture shooting is being carried out, in order to inform a user that monitor motion picture shooting is going on, the CPU 110, for example, as shown in Fig. 5(3), displays a character "REC" on the sub display part 104, and it displays a transitional state of current recording time so as to record the setting time by means of numerical characters and so on. In this way, a user can recognize that the motion picture shooting is going on and how much recording time remains, so that the usability is good.

Also, if it can be simply seen that the motion picture shooting is going on, the manner in which such information is indicated is not limited to the above-described one, and a bar graph, an icon and so on may be utilized (Fig. 5(11)). In this way, it is possible to recognize viscerally that the motion picture shooting is going on and how much recording time remains.

On the other hand, when the motion picture shooting is started, the CPU 110 refers to the record setting time information which was stored in the volatile memory 102a, and it starts a timer function which has the record setting time as a set value in CPU 110. In case the time which is being counted by the timer function passes the record setting time (S308), or in case a user, for example, as seen in a screen of Fig. 5(3), carries out an operation, such as depressing the sub operation key 107b to which the"STOP" function was assigned, and so on (S309), the CPU 110 stops compression of the motion picture preparation use image data and the motion picture preparation use sound data, stops operation of the camera 109 and the microphone 111, and combines the compressed motion picture preparation use image data and the motion picture preparation use sound data, and, thereby, prepares a file of a MPEG4 format, and

stores it in the volatile memory 102a. During a period of carrying out this processing, the CPU 110, for example, by use of a screen as shown in Fig. 5(4), informs the user that "PROCESSING" is going on, so as not to give concern of a failure and so on to the user.

Furthermore, the CPU 110 refers to information of a head 1 frame from the motion picture data, which was stored in the volatile memory 102a, and carries out decoding processing of the information of the head 1 frame which was referred to, and displays the decoded image information (1st frame) on the sub display part 104 (S310).

A user refers to the image information of this 1st frame, and he/she can select whether the motion picture information which was stored in the volatile memory 102a so far is to be stored in the non-volatile memory 102b or not (S311).

In case the motion picture information stored in the volatile memory 102a is stored in the non-volatile memory 102b, for example, as seen in the screen of Fig. 5(5), when the sub operation key 107b to which the function "STORE" was assigned is depressed, the CPU 110, on the basis of the sub operation key ID information signal which was inputted, stores the file of MPEG4 format that is stored in the volatile memory 102a in the non-volatile memory 102b (S312). After that, when the sub operation key 107b to which the function "CONFIRM" was assigned is depressed, the CPU 110 again starts the motion picture monitoring (Fig. 5(6)).

On the other hand, for example, as seen in the screen of Fig. 5(5), when the sub operation key 107b to which the function "RETURN" was assigned is depressed, the CPU 110 displays information of an image which was taken by the image pickup camera 109 on the sub display part 104, and again starts the motion picture monitoring

(S304, Fig. 5(2)). In case of returning to the motion picture monitor display again without storing the motion picture that is stored in the volatile memory 102a in the non-volatile memory 102b, for example, as seen in the screen of Fig. 5(5), when the sub operation key 107a to which the function "RETURN" was assigned is depressed, a motion picture shooting data deletion signal is inputted to the CPU 110, and the CPU 110 deletes image data which was stored in the volatile memory 102a from the start of motion picture shooting at S307, and it displays information of an image which was taken by the image pickup camera 109 on the sub display part 104, following which motion picture monitoring is started again (S304, Fig. 5(2)).

In addition, in the case of finishing the motion picture shooting, it is ended by sliding the mode selection key 105 upwardly again. That is, the CPU 110, on the basis of a signal from the mode selection key 105, displays an idle screen, as shown in Fig. 5(1), on the sub display 104.

Also, it may be that the CPU 110, for example, displays an item "RETURN" at the lower left of the screen of Fig. 5(3); whereby, and in case there is no "STOP" operation within the above-described record setting time, when the sub operation key 107a to which the function "RETURN" was assigned is depressed, the CPU 110 stops compression of the motion picture preparation use image data and the motion picture preparation use sound data, and stops operation of the microphone. In this way, in case motion picture shooting is mistakenly started, or in case a user starts the motion picture shooting but changes his/her mind and wishes to stop the motion picture shooting, it is possible to quickly return to a monitoring state of the motion picture shooting. On that account, it is possible to enhance the efficiency of processing of the CPU 110, so that

the usability is improved.

Also, the method of carrying out the zoom adjustment is not limited to the above-described method. For example, it may be that the set value of pickup image size of the image pickup camera 109 is changed, and from information of an image which was taken by the camera 109 after the set value was changed, the image of a size before such change is pulled out.

Next, processing in the case where the still picture mode was selected by the mode selection key 105 will be described. In this regard, since the processes from steps S301 to S303 are the same as in the motion picture mode, a description thereof will be omitted. However, there is a difference in that the mode selection key 105 is slid to the downside to which the still picture mode function was assigned.

When the still picture mode is started (S314, Fig. 5(7)), a user selects whether adjustment of the magnification of the size of information of an image which was displayed on the sub display part 104 (zoom adjustment) is to be carried out or not (S315). In addition, since the operation for carrying out zoom adjustment (S315, S321) is the same as that in the motion picture mode, a description thereof will be omitted.

Next, in case the zoom adjustment is not carried out, or in case motion picture shooting is carried out after the zoom adjustment has been completed, for example, as seen in the screen of Fig. 5(7), the sub operation key 107b to which the function "SHOOT" was assigned is depressed, and still picture shooting is carried out (S316). In this case, the CPU 110, on the basis of the sub operation key ID information signal which was inputted from the sub operation key 107b, compresses information of an image which was taken by the camera 109 as motion picture preparation use image

data, and stores the compressed data in the volatile memory 102a; for example, it stores it as data having a format like YUV(4:2:2) in the volatile memory 102a. Then, it stops the shooting of the camera 109 (S317) and displays the information of an image which was stored in the volatile memory 102a on the sub display part 104 (S318, Fig. 5(8)).

After that, the user selects whether the still picture which was stored in the volatile memory 102a is to be stored in the non-volatile memory 102b or not (S319, Fig. 5(8)).

In the case where the still picture which was stored in the volatile memory 102a is to be stored in the non-volatile memory 102b, in the state in which the information of an image which was shot is being displayed on the sub display part 104, for example, as seen in the screen of Fig. 5(8), the sub operation key 107b to which the function "STORE" was assigned is depressed (S319). By this operation, on the basis of the sub operation key ID information signal which is inputted from the sub operation key 107b, the CPU 110 compresses the data of YUV (4:2:2) format which was stored in the volatile memory 102a by, for example. JPEG format, and stores it in the non-volatile memory 102b (S320, Fig. 5(9)).

Also, in the case of returning to the still picture monitor display (Fig. 5(7)) in the state in which information of an image which was shot is being displayed on the sub display part 104 (Fig. 5(8)), for example, as seen in the screen of Fig. 5(8), when the sub operation key 107a to which the function "RETURN" was assigned is depressed (S316), the CPU 110 again starts the shooting of the image pickup camera 109, and displays the information of an image which is taken by the image pickup camera 109

under control of the CPU 110 on the sub display part 104, and starts again the still picture monitoring (S314).

Also, in case of finishing the motion picture shooting, it is ended by sliding the mode selection key 105 downwardly again. That is, the CPU 110, on the basis of a signal from the mode selection key 105, displays an idle screen, as shown in Fig. 5(1) on the sub display part 104.

By the foregoing operations, without taking the trouble to open the portable telephone, the motion picture mode or the still picture mode can be activated, and by utilizing the sub operation keys 107a and 107b, which are disposed on the back surface, it is possible to carry out image shooting, so that the usability of the portable telephone is improved.

Also, since the information of an image which was taken by the image pickup camera 109 is displayed on the sub display part 104, before the user stores the image information in the non-volatile memory 102b, so that after that, he/she can select whether it is to be stored in the non-volatile memory 102b or not, it is possible to store only an image which a user really wishes to store in the non-volatile memory 102b, so that the usability is improved.

Furthermore, since there is no necessity to store information of an image which has failed to be taken and information of an image which was mistakenly taken in the non-volatile memory 102b, it is possible to effectively make use of a limited memory capacity.

In addition, image information of a motion picture or a still picture which was taken, for example, is stored in the memory 102 by use of a format as shown in Fig. 4

(S312, S320). This information is recorded in association with each item, such as, for example, a storage format, an "image number" which represents a number of an image which was taken, an "image data name" which represents a name which identifies the image data, a "data format" which represents the data format, such as JPEG, MPEG and so on, an "amount of data" which represents the capacity of the data, an "image pickup date" which represents the date of the image pickup, and "GPS additional information" which represents additional information, such as GPS information. Copyright information is also recorded indicating the good and status bad of an attachment to mail which represents whether it is acceptable or not to attach data of an image to mail, the good and bad status of serial transfer of copyright information" which represents whether it is acceptable or not to serially transfer data of an image to another information processing terminal, for example, a PC, FDA, a portable telephone and so on, and "the number of possible reproductions of copyright information (or time of possible reproductions) which represents the number (or time) of reproduction of data of an image which was taken, and so on. If the information is stored in the described manner, it is available on the occasion of utilizing data of an image which was taken.

In the meantime, the above-described sub operation key 107 is controlled by the CPU 110, and even if the same key was depressed, in a different state, it may be treated as a different input signal. For example, the sub operation key 107 is, in the case of a normal standby state, for example, as shown in Fig. 14, used for switching a screen of the sub display part 104. Hereinafter, this operation will be described with reference to Fig. 14.

Fig. 14(1) shows an example of a screen in which set information of a mode,

such as "MANNER MODE" and so on, is displayed, Fig. 14(2) shows an example of a screen in which current time information is displayed in an enlarged manner, and Fig. 14(3) shows an example of a screen in which newly arrived information concerning a telephone call, mail and so on is displayed.

In each screen of Fig. 14(1) to Fig. 14(3), the sub operation key 107a functions as a "RETURN" key, and the sub operation key 107b functions as a "NEXT" key. When the "NEXT" key 107b is depressed, a screen transition signal is inputted to the CPU 110 as an input signal, and, in response to the screen transition signal, the CPU 110 switches the display screen of the sub display part 104 to the next screen. By repeating this operation, the screen is switched in the sequence of Fig. 14(1) → Fig. 14(2) → Fig. 14(3) → Fig. 14(1)→ ....

On the one hand, when the "RETURN" key 107a is depressed, a screen return signal is inputted to the CPU 110 as an input signal, and in response to the screen return signal, the CPU 110 switches a display screen of the sub display part 104 to a previous screen. By repeating this operation, a screen is switched in the sequence of Fig. 14(1) → Fig. 14(3) → Fig. 14(2) → Fig. 14(1) → ....

In contrast to this, in the case of the camera mode, in which shooting is carried out by the image pickup camera 109, the sub operation key 107a is assigned by CPU 110 as an operation key regarding camera shooting, for example, as the shutter key, and when the sub operation key 107a is depressed, a shutter signal is inputted to the CPU 110 as an input signal.

In addition, as seen in Fig. 14(3), in case there is no newly arrived information, it may be that the number is displayed as "0", and a screen such as shown in Fig. 14(3) is

not displayed. In this case, the CPU 110 effects control in such a manner that, when the "NEXT" key 107b is depressed in the case of Fig. 14(2), the screen is changed to that of Fig. 14(1), and when the "RETURN key 107a is depressed in the case of Fig. 14(1), the screen is changed to Fig. 14(2)".

In this way, to cause a screen for showing newly arrived information to be not displayed in case there is no newly arrived information, a user can confirm the presence and absence of newly arrived information sensuously by a transition state of the screen, so that the usability is improved.

As described above, since the sub operation key 107 changes the function of an input signal as the case may be and one operation key can be used to initiate a plurality of functions, in a small size terminal, like a portable telephone, it is possible to effectively make use of space, which contributes to reduction of the circuit size.

Furthermore, for example, in case of playing a game using the sub display part 104, and in case of displaying information regarding music, such as a music file etc. of mp3 format etc. in the sub display part 104, it is possible to make use of the sub operation key 107 as an operation key for these functions.

In addition, in the above-described embodiment, an example of completing camera shooting in the closed state was described, but next, a structure which enables camera shooting continuously, even when the portable telephone is opened in midstream of its operation, will be described.

In this case, the CPU 110, if it confirms that the portable terminal has changed to the open state from the closed state with reference to the opened and clos state information detected by the fold detection part 108, holds the state of the camera

operation which was carried out by the sub operation key 107 so far (the display screen in use, the zoom adjustment level and soon) and displays a display screen which was associated in advance with the display screen which was held on the main display part 103 (e.g., Fig. 5(12)).

Here, in the non-volatile memory 102b, a display screen produced in each step which is displayed on the sub display part 104 (e.g., Fig. 5(1) to Fig. 5(9)) and a display screen produced in each step which is outputted to the main display part 103 are stored in association with each other. In addition, although not shown in the figures, the CPU 110 outputs a screen which corresponds to Fig. 5(1) to Fig. 5(9) as a display screen which is displayed on the main display part 103 when the portable terminal is in the open state. In this case, it is desirable that the number of display screens which are displayed on the sub display part 104 is made to be equal to the number of display screens which are displayed on the main display part 103.

Fig. 5(12) is similar to Fig. 5(1) and shows an example of a display screen which is associated with it; and, in the case where the portable telephone is in the open state, it is possible to make use of the main operation key 106. On that account, in addition to "ZOOM" and "SHOOT", adjustment of "EXPOSURE" is assigned to the operation key, and also, taking the size of the area of the main display part into consideration, it is designed to also display information indicating a remaining power capacity of a rechargeable battery, the time and so on. Also, taking the difference in screen size between the sub display part 104 and the main display part 103 into consideration, information of an image which was taken by the camera is processed so as to be displayed with a size which is coordinated with the screen size.

In this way, even if the portable telephone in the closed state is changed to the open state during a period in which the camera shooting function is activated, it is possible to carry with the camera shooting through a display screen which is suited to the respective states, so that the usability is improved. It is the same in the case where the portable telephone in the open state is changed to the closed state.

In addition, the associated display screen is not limited to a display screen as shown in Fig. 5(12), but, for example, it may be that the display screens which are displayed on the sub display part 104 and the main display part 103 become a similar screen, with similar key assignment. If it is configured in this way, there is an advantage in that, even if the portable telephone in the open state is changed to the closed state, the camera operation can be carried on by a similar operation.

Also, in order to easily carry out a search of the associated display screens, search information is added to each display screen data, such as, for example, in a screen as shown in Fig. 5(7), "sub07" is added, and in a display screen which is displayed on the main display part which corresponded to that, "main07" is added. On the basis of this search information, the CPU 110 searches for a screen to be outputted and outputs it to the respective display parts. In this way, it is possible to enhance the search efficiency of the associated display screens. In this case, by making use of the search information, a display mode to be displayed on the sub display part 104 and a display mode to be displayed on the main display part 103 are stored in the non-volatile memory 102b in such a manner that the modes are associated with each other.

As described above, switching from main to sub in camera shooting was taken as an example, but the invention is not limited to camera shooting, and it is applicable to

an operation which outputs an image to a predetermined display screen.

On the other hand, as shown in Figs. 1(2) and 1(4) etc., the reason why the number of sub operation keys to which the shooting time operation key was assigned is set to be two is because the area of the back surface of the housing 200 is limited, and if the number of keys becomes three and more, the distance between keys becomes narrower, so that there is a concern that a wrong operation will occur, in which an adjacent key is mistakenly depressed and so on. Therefore, for example, in order to prevent a concern that a wrong operation may occur, the shape of a key, such providing one as a slide type key (Fig. 12(1), and by making the distance between keys larger (Fig. 12(2)), it is possible to provide, for example, three keys, and more of the shooting time operation keys, such as the shutter key, the zoom adjustment key and so on, are disposed on the back surface of the housing 200.

Also, as shown in Fig. 12(2), in case of a three key structure on the back surface, it is possible to make use of a circuit regarding main operation keys 106a, 106b and 106c for sub operation keys 107a, 107b and 107c on the back surface without any change, which contributes to a reduction of the manufacturing cost.

Also, in case sub operation key 107 is provided as two keys, since there is a concern that, when the two sub operation keys 107a and 107b are disposed above and below each other, when the upper operation key is pressed by the thumb, the lower operation key will also be depressed, so that the usability is bad. Thus, as shown in Figs. 1(2) and 1(4) etc., they should be disposed on the left and right; and, for example, as shown in Fig. 12(2), it is even more preferable to dispose them as shifted in an oblique direction.

Also, it is preferable if, for example, the functions of the sub operation keys 107a and 107b at the time of camera operation are made to be the same as those of the main operation keys 106a and 106b, and an operation when the portable terminal is in the open state is made to be the same as the operation performed when the portable terminal is in the closed state. That is, it is preferable to be able to realize similar processing operations to those which were described with reference to Figs. 3 and 5 by use of the main operation keys 106a and 106b when the portable terminal is in the open state. In this way, the necessity to take the trouble to change operations between the open state and the closed state of the portable terminal is eliminated, so that the usability by a user is improved.

Furthermore, in this embodiment, a sound hole is disposed between the sub operation keys 107a and 101b, and by this, a user can easily identify the position of the sound hole by tactile sensation. On the basis of that, the physical relationship of both keys becomes clear, and, therefore, without taking the trouble to identify the position of the key, it is possible to operate it sensuously. Also, in this way, the distance between the sub operation keys 107a and 107b is apparent, so that it is possible to prevent a wrong operation, such as a wrong key depression and so on.

In addition, the sound hole of a music speaker is disposed between the sub operation keys 107a and 107b. However, the invention is not limited to this, but, in order to clarify the physical relationship of both keys, a convex prong or a concave groove and so on may be disposed therebetween. In addition, in this embodiment, the mode selection key 105, which is used also as the activation key, is formed on the side surface of the housing 201 and is in the form of a slide type key; therefore, since a

certain degree of force is required in order to slide the operation key for mode selection, it is configured so as to prevent a wrong operation by the user. In particular, the usability is good from the point of view that, even if the mode selection key 105 is depressed without sliding when the housing is held, the key will not be operated.

Also, assuming that the mode selection key 105 is disposed on the side surface of the housing 200, and that when sliding it upward when the portable telephone is in the closed state, the mode is transferred to the motion picture mode, and when sliding it downward, it is transferred to the still picture mode. Whensliding it upward when the portable telephone is open, although it is transferred to the motion picture mode in the closed state, here, it is transferred to the still picture mode.

Therefore, as shown in Fig. 1, when a slide type key is used as the mode selection key 105 and it is disposed on the side surface of the housing 201, regardless of the open and closed states of the portable telephone, the same mode selection can be realized by the same slide operation, so that usability is improved.

Next, the operations of the main display part 103 and the sub display part 104 at the time of camera shooting will be described.

First, the operations that are performed when the portable telephone is in the open state, will be described. In a case where the lens of the image pickup camera 109 is directed toward the user, unless the image of the user himself/herself at this time is displayed on the main display part 103 as a mirror image, for example, in a case where the user moves to the right, but, on the screen, the displayed image shows that the user has moved to the left, there is a problem that it is hard to shoot. On that account, the CPU 110 detects that the portable telephone is in the open state by use of the fold

detection part 108, and detects that the image pickup camera 109 faces toward the user by use of, for example, a sensor, a switch and so on, in response to which the CPU 110 carries out a horizontal reversal of the image.

Next, in a case where the lens of the image pickup camera 109 is directed toward an object of shooting, which is opposed to the user, in a state in which the portable telephone is in the open, at this time, if the image pickup camera 109 is approximately 180 degrees folded around the X-X axis of Fig. 1(1), the image which is displayed on the main display part 103 becomes upside down. In this connection, the CPU 110 detects that a portable telephone is in the open state by use of the fold detection part 108, and detects that the image pickup camera 109 faces toward an object of shooting by use of, for example, a sensor, a switch and so on, and performs a vertical flipping of the image. Also, in this case, it is possible to display an image which was taken in by the image pickup camera 109 on the sub display part 104; and, on this occasion, the CPU 110 detects that the portable telephone is in the open state by use of the fold detection part 108, and detects that the image pickup camera 109 faces toward user by use of, for example, a sensor, a switch and so on, and performs a horizontal flipping of the image, whereby the image is display upright on the sub display part 104.

Next, the operations which occur when a portable telephone is in the closed state will be described. In case the lens of the image pickup camera 109 is directed toward the user while the portable telephone is in the closed state, at this time, as described above, since an image which is displayed on the sub display part 104 should be a mirror image, the CPU 110 detects that the portable telephone is in the closed state by use of the fold detection part 108, and detects that the image pickup camera 109 faces toward

the user by use of, for example, a sensor, a switch and so on, and performs a horizontal flipping of the image.

Next, in case the lens of the image pickup camera 109 is directed toward an object of shooting which is positioned opposite to the user while the portable telephone is in the closed state, as described above, since the image is displayed upside down on the sub display part 104, the CPU 110 detects that the portable telephone is in the open state by use of the fold detection part 108, and detects that the image pickup camera 109 faces toward an object of shooting by use of, for example, a sensor, a switch and so on, and performs a vertical flipping of the image.

As described above, by detecting the open and closed states of the portable telephone and the direction in which the camera is pointing at that time, and by having a display of the main display part 103 or the sub display part 104 flipped horizontally or flipped vertically, the usability at the time of shooting is improved.

Also, in case the camera is directed toward an object of shooting in the open state, by displaying an image pickup monitor screen not only on the main display part 103, but also on the sub display part 104, a person who is the object of shooting can also confirm the state of shooting himself/herself, and, therefore, it is possible to perform the shooting at ease.

Still also, it may be that after shooting, without any change of the state in which a portable telephone is closed, by use of the sub display part 104, confirmation or deletion and so on of an image which was taken can be carried out.

In this case, for example, when the mode is changed to a browsing mode for confirming images which were taken by the mode selection key 105, the CPU 110

displays the images which were taken on the sub display part 104. As a display mode, it is fine if the images which were taken can be confirmed, and, for example, the images which were taken may be displayed one by one in a chronological order of recording, or they may be displayed as a list. On that occasion, if a user selects an image which he/she wants to delete by use of the sub operation key 107 and instructs deletion of an image, an image deletion instruction signal is inputted through the sub operation key 107 to the CPU 110, and the CPU 110 carries out processing to delete image data which was stored in the memory 102.

Also, it is possible to carry out editing and so on of images which were taken, by use of the sub display part 104. In this case, when the mode is changed to an editing mode by depressing the mode selection key 105, the CPU 110 displays a screen for selecting an editing function, such as, for example, black and white, sepia, frame and so on, on the sub display part 104. When a user selects any one of the editing functions by operation of the sub operation key 107, an editing instruction signal is inputted to the CPU 110, and the CPU 110 edits image data on the basis of the editing instruction signal.

In this way, without taking the trouble to open the portable telephone after shooting, and without any change of the state in which the portable telephone is folded, a limited number of sub operation keys are used; and, thereby, it is possible to carry out confirmation, editing and so on of images which were taken, so that the usability is improved.

Next, processing in case of sending mail with a still picture or a motion picture as an attachment file, after the still picture or the motion picture have been taken, by

making use of the above-described sub operation key 107, in a state in which the portable telephone is closed, will be described (second embodiment), hereinafter with reference to the flow chart of Fig. 6 and the display screen example of Fig. 7.

In addition, since the process steps from S601 to S605 of Fig. 6 are steps which are formed by simplifying the process steps from steps S304 to S312 and from steps S314 to S320 of Fig. 3, and Figs. 7(1) and 7(2) are the same as Figs. 5(7) and 5(8), the descriptions thereof will be omitted here.

Now, as seen in Fig. 7(3), the sub operation key 107a functions as a "RETURN" key and the sub operation key 107b functions as a "MAIL" key.

When a signal from this "RETURN" key 107a is inputted to the CPU 110 (S606), the CPU 110 deletes the display which was being displayed on the sub display part 104, and displays a still picture or a motion picture (1st frame), as shown in Fig. 7(2), on the sub display part 104.

On the other hand, as seen in Fig. 7(3), when a signal from a mail key 107b is inputted to the CPU 110 (S606), the CPU 110 activates the E-mail mode (S607), secures a region for use in mail editing in the non-volatile memory 102b, and designates still picture data or motion picture data which was stored in the non-volatile memory 102b as a file which is to be attached to mail to be sent. Subsequently, the CPU 110 refers to address book data which was stored in the non-volatile memory 102b, and, for example, as shown in Fig. 7(4), displays name information of friends, acquaintances and so on ("AAA", "BBB"...) on the sub display part 104 (S608). Here, the name information, if it represents friends, acquaintances and soon, may not be real names, but may be nicknames, cryptographs or numerical characters and so on.

In Fig. 7(4), the sub operation key 107a functions as a "DECIDE" key, and the sub operation key 107b functions as a "SCROLL" key. When a signal from the scroll key 107b is inputted to the CPU 110, the CPU 110 scrolls a cursor, for example, for selecting a person to which mail is to be sent from a list of names which is displayed on the sub display part 104. Also, when a signal from the decide key 107a is inputted to the CPU 110, the CPU 110, in order to confirm the user whether a person who was selected by the cursor is set to be a destination to which mail is to be sent or not, displays a display for having a user select of sending mail to the selected person, for example, as shown in Fig. 7(5), on the sub display part 104 (S609).

Also, as seen in Fig. 1(5), in the same manner as shown in Fig. 7(4), the sub operation key 107a functions as a "DECIDE" key, and the sub operation key 107b functions as a "SCROLL" key.

In case the cursor was moved to the position "NO" by the scroll key 107b, when a signal from the decide key 107a is inputted to the CPU 110, the CPU 110 displays a screen for selecting another person to which mail is to be sent, as seen in Fig. 7(4), on the sub display part 104. On this occasion, if the cursor is moved to a position of the name information of the destination designated the last time to which mail was sent, necessity to take the trouble to search again in the name information list from its head is eliminated, so that the usability is improved.

On the one hand, when the cursor is moved to the position "Yes" by the scroll key 107b, and a signal from the decide key 107a is inputted to the CPU 110, the CPU 110 searches the address book data which was stored in the non-volatile memory 102b using the name of a person who was selected in S608 as a search key, and refers to a

mail address which corresponds to the search key, and copies it in a mail address region for use in editing mail which was secured in the non-volatile memory 102b.

After that, the CPU 110, for example, establishes a link to a communication network, such as a portable telephone network and so on, and then, connects to a mail server (not shown). Subsequently, the CPU 110 outputs data of the region for use in editing mail which is in the non-volatile memory 102b to a communication part 101, and the communication part 101 sends mail data to the mail server through a wireless link which was established previously (S610).

When the sending of the mail data is completed, the CPU 110 terminates the connection with the mail server and ends communication by opening the established wireless link, and, for example, as shown in Fig. 7(6), displays an indication informing the user that the sending of the mail has been completed on the sub display part 104.

In Fig. 7(6), the sub operation key 107a functions as an "END" key, and the sub operation key 107b functions as an "ADDRESS" key, and the user selects whether or not the sending of mail is to be carried out to a person who is different from the person designated previously, to whom the mail was sent, or whether or not the E-mail mode is finished (S611).

When the address key 107b is depressed and a signal from the address key 107b is inputted to the CPU 110, the CPU 110 displays a screen for selecting a person to when mail is to be sent, as seen in Fig. 7(4), on the sub display part 104 (S608), and carries out the above-described steps S609 to S611.

On the one hand, when the end key 107a is depressed and a signal from the end key 107a is inputted to the CPU 110, the CPU 110 causes activation of the E-mail mode

to end (S612), and carries out the display of a still picture or a motion picture which was taken in by the image pickup camera 109 (S601)(Fig. 7(1)).

As described above, since the mode is automatically transferred to the E-mail mode after a still picture or a motion picture was shot in the state in which the portable telephone is closed, without taking the trouble to open the portable telephone, it is possible to send a still picture of a motion picture which was taken to a person who wants is, so that the usability is improved.

Also, in the state in which the portable telephone is closed, without inputting characters, numeric characters and so on, but only by use of an operation for selecting a person to which mail is to be sent, information of an image which was taken is sent as an attachment to the mail, even in the case where there is a limited number of operation keys (sub operation key 107) on the back surface, and so it is possible to quickly send mail by a simple operation.

Also, normally, in the state in which the portable telephone is open, since it is possible to make use of the main display part 103 which has a relatively large area and the main operation keyboard 106, which has a plurality of operation keys, a display screen for inputting a destination to which mail is to be sent, the subject matter, and the text (characters, pictographic characters, numeric characters and so on) of the mail are outputted. Therefore, in this embodiment, when the portable telephone is in the open state, image information is sent to the main display part 103 by an E-mail function which uses a display screen in which character inputting is available, and when the portable telephone is in the closed state, image information is sent to the sub display part 104 by use of a display screen having no character input. In addition, even when the portable

telephone is in the open state, as shown in Fig. 7, it is also possible to send mail with the transition of a display screen which prohibits the character input, and, in this case, for example, if a user can select a mode by dividing a mode into, for example, a "NORMAL MODE" in which character inputting is available and a "SIMPLIFIED MODE" in which character inputting is prohibited, the usability is better.

Also, in the above-described embodiments, taking operability and swiftness of operation of the portable telephone in the closed state into consideration, an example of sending only image information without inputting text information, such as characters, numeric characters and so on, was considered, but depending on the circumstances, there may be a situation in which one wants to send text together with image information. In this case, this can be realized by actions in which a user prepares a given text (title, content of a text and so on) and has the text registered in advance.

And, after a destination to which mail is sent has been determined in steps S609, the CPU 110 copies a text format (title, content of the text and so on) which was stored in the non-volatile memory 102b in advance to the region for use in editing mail, which was secured in the non-volatile memory 102b, to thereby complete the mail editing, and this is sent to the selected sending destination (S610). That is, this operation is realized by sending text which was registered in advance to the selected sending destination.

In this way, even when the portable telephone is in the closed state, it is possible to send a text of a format which was registered in advance only by designating an address of a sending destination, and it becomes possible to send any text to a sending destination.

Also, it is possible to have a user select whether a text format is to be sent or not,

or a text format which is sent out of a plurality of text formats. In this case, the CPU 110, for example, after a screen such as shown in Fig. 7(5) has been outputted, outputs a screen like that shown in Fig. 7(7), and the user selects the format of the text to be sent. Here, in case that "NO TEXT" is selected, the CPU 110 does not copy any text to the region for use in editing mail, and proceeds to send only image information. Also, for example, as shown in Fig. 7(8), in case the text format "FORMAT 1" was selected, the CPU 110 displays the content of the selected text format (format 1).

Next, when an input signal is inputted from the sub operation key 107a, which functions as the "RETURN" key in Fig. 7(8), the CPU 110 operates to return to the screen of Fig. 7(7). On the other hand, when an input signal is inputted from the sub operation key 107b which functions as a "SEND" key in Fig. 7(8), the selected text format is copied to the region for use in editing mail, which was secured in the non-volatile memory 102b, to cause the mail editing to be completed, and the mail is sent to the selected sending destination (S610, Fig. 7(6)). In this way, a user can select a text format in response to a person to which mail is sent and information of an image which was taken, so that the usability is good.

Also, since the content of the text is displayed prior to mail sending, a user can confirm in advance the content of the text to be actually sent, and, for example, it is possible to prevent a wrong operation in which a text format with a content which is different from that of a text format that one wants is selected. Also, if titles are included, it is possible to display a list of the titles.

In addition, if a user can register a plurality of text formats in the non-volatile memory 102 in advance, it is needless to say that the usability will be improved.

Also, in the above-described embodiment, an example was considered in which information of an image which was taken by the image pickup camera 109 is simply attached to mail without any change in the closed state of the portable telephone and the mail is sent together with the image information, but the invention is not limited to this, and mail which does not have image information attached thereto may be sent.

In this case, for example, in a standby state, as shown in Fig. 5(1), activation processing of the E-mail mode can be carried out, and, the in processing which is carried out after this, processing from the above-described steps S607 to S612 (Figs. 7(4) to 7(6)) is carried out.

In this way, for example, even in a case where an electric train on which a person is riding is involved in an accident and there is a necessity for the person to quickly contact his/her company and home, and so on, since it is possible to get in touch with a superior of the company, a member of the family and so on by sending mail having a predetermined content, such as, for example, "Please understand that I will be delayed because of an emergency situation. I will be in touch with you again when I am able to contact later." This can be accomplished in a state in which the portable telephone is closed, and by a simple operation, so that usability is improved.

On the other hand, in the embodiments which were described so far, an example was considered in which mail sending is begun with the portable telephone in the closed state, but it is assumed that portable telephone is changed to the open state midstream of its operation. In this connection, an example of a technique for alerting the user to return the portable telephone to the closed state again at the end of transmission will be described.

In this case, the CPU 110, if it confirms that the portable telephone went into the open state, with reference to the open and closed state information which was detected by the fold detection part 108, during the period of a mail sending operation, holds the operations which were carried out by the sub operation key 107 so far, and displays on the main display part 103 an alert message of, for example, "Mail is being prepared. Please close the portable telephone." After that, the CPU 110, if it recognizes that it went into the closed state, with reference to the open and closed state information which was detected by the hold detection part 108, displays the display screen, which was displayed on the sub display part 104 right before the portable telephone was opened, on the sub display part 104 again, and proceeds so as to continuously carry out the operation.

In this way, for example, in case the user opened the portable telephone unintentionally in the midstream of an operation for sending mail while the portable telephone was in the closed state, and so on, since the alert message is displayed on the main display part 103, it is possible to urge the user to close the portable telephone and to continuously carry out the operation of mail sending.

In addition, as alert means, for example, to display a color for alerting the user (e.g., red color) on the main display part 103 or the sub display part 104, or to give alert by use of alert sounds, or to give alert by use of a combination of an alert sound, characters and color information, may be carried out. Or, it may be possible to have a user selected a type of the alert sound and characters to be displayed.

Also, in the above-described embodiment, there was an assumption that the operation of mail sending can not be carried out by the main operation keys 106 in case

the portable telephone was changed from the closed state to the open state in midstream of the operation, and an alert was produced for returning the portable telephone to the closed state, however, even in the open state, if the operation of mail sending is carried out continuously by use of the sub operation keys 107, the usability is good.

In this case, the CPU 110, if it confirms that the portable telephone was changed to the open state, with reference to the open and closed state information which was detected by the fold detection part 108, holds the operations which were carried out by the sub operation key 107 so far, and displays on the main display part 103 the display screen which was displayed right before the portable telephone is opened. In this case, the CPU 110 operates in such a manner that the assignment of functions to the operation keys which are displayed at lower left and right sides of a display screen of the main display part 103 becomes the same as that of the sub display part 104. That is, processing is carried out in such a manner that a display as shown in Fig. 7 and so on is switched from the sub display part 104 to the main display part 103, and in each display screen, functions which were assigned to the sub operation keys 107a and 107b are assigned to the main operation keys 106a and 106b. Also, in case the portable telephone is closed again, similar processing to the above-described processing is carried out.

In this way, a common display screen is utilized in both of the closed state and the open state, and the functions of the operation keys which were disposed on the front surface and the functions of the operation keys which were disposed on the back surface, for example, the function of the main operation key 106a and the function of the

sub operation key 107a, the function of the main operation key 106b and the function of the sub operation key 107b, are made to be the same, and thereby, even if the portable telephone was changed to the open state in the midstream of an operation for sending mail that was started with the portable telephone in the closed state, it is possible to continuously carry out mail sending by a similar operation, so that the usability is good.

Next, an embodiment in which a text can be displayed by the main display part 103, which is of a relatively large size, and the main operation keyboard 106, which includes a plurality of operation keys, by opening the portable telephone after a person to whom mail is to be sent was selected which the portable telephone was in the closed state, will be described.

In this case, for example, if the portable telephone is opened after a sending destination has been selected on the screen, as shown in Fig. 7(4), the CPU 110 recognizes that the portable telephone was changed to the open state, with reference to open and closed state information which was detected by the fold detection part 108, and it displays on the main display part 103 an input screen wherein characters, numerical characters and so on can be inputted. And, a user, by making use of the main operation keyboard 106, inputs characters and so on in this input screen to carry out the sending of mail.

In this way, for example, in case in which a user was thinking that he/she would send an email quickly with the portable telephone in the closed state at first, but has changed his/her mind in midstream and decides that he/she also wants to input text and send it, since the input screen for characters will be automatically displayed on the main display part 103 simply by opening the portable telephone, the usability is good. In this

case, "after a destination of mail sending was selected" was set as a condition, but it may be configured to carry out similar processing even before a sending destination is selected. In this case, is possible simply to automatically activate a normal mail function which is used in the open state.

As described above, the mail sending function in the closed state was considered, but it is needless to say that the key layout, the display screen and so on are not limited as described relative to this embodiment. Also, as to the operation of sending mail by use of a display screen with no character input, it is needless to say that it is applicable not only to a fold type portable telephone, but also to other types of portable telephone.

Next, the processing which is carried out in case mail is received while the portable telephone is in a closed state will be described (third embodiment) hereinafter with reference to the flow chart of Fig. 8 and the example of the display screen as shown in Fig. 9.

For example, in the standby state in which an idle screen as shown in Fig. 9(1) is displayed (S801), when mail is received from a mail server through a communication network, such as a portable telephone network, and the communication part 101, the CPU 110, in response to a mail reception signal, sends a mail data download request signal to the mail server, and further, the mail server, which has received the download request signal, sends mail data to the portable telephone (S802). At this time, the CPU 110, which has received mail data, stores the mail data in a mail reserve region of the non-volatile memory 102b.

Further, at this time, the CPU 110 refers to the mail address of the sender from

the mail data which is in the non-volatile memory 102b, and searches for a corresponding name in the address book data which is stored in the non-volatile memory 102b by use of the obtained mail address as a search key, and, for example, as shown in Fig. 9(2), it produces a display for inquiring whether the name of the sender and the content of the received mail are to be displayed on the sub display part 104 (S804).

In Fig. 9(2), the sub operation key 107a functions as a "No" key, and the sub operation key 107b functions as a "Yes" key. When a signal from this No key 107a is inputted to the CPU 110, the CPU 110 displays, for example, an idle screen, as shown in Fig. 9(1), on the sub display part 104 (S805). At this time, for the purpose of informing the user that there is mail data whose content has not been displayed, the CPU 110 may display an appropriate icon on the sub display part 104.

On the other hand, when a signal from the Yes key 107b is inputted to the CPU 110 (S805), the CPU 110 refers to the mail data which is in the non-volatile memory 102b, and displays a message, for example, as shown in Fig. 9(3), on the sub display part 104 (S806).

In Fig. 9(3), the sub operation key 107a functions as a "RETURN" key and the sub operation key 107b functions as an "IMAGE" key. When a signal from this "RETURN" key 107a is inputted to the CPU 110, the CPU 110 displays, for example, an idle screen, as shown in Fig. 9(1), on the sub display part 104 (S807).

Also, when a signal from the "IMAGE" key 107b is inputted to the CPU 110, the CPU 110 refers to image data of the mail data which is in the non-volatile memory 102b, decode-processes the image data, and displays it, for example, as shown in Fig. 9(4),

on the sub display part 104.

In Fig. 9(4), the sub operation key 107a functions as a "RETURN" key, and the sub operation key 107b functions as a "STORAGE" key. When a signal from this "RETURN" key 107a is inputted to the CPU 110, the CPU 110 refers again to the mail data which is in the non-volatile memory 102b, and displays a message, for example, as shown in Fig. 9(3), on the sub display part 104 (S809).

Also, when a signal from the "STORAGE" key 107b to a folder is inputted to the CPU 110, the CPU 110 refers to image data of mail data which is in the non-volatile memory 102b and copies it in an image reserve region which is in the non-volatile memory 102b (S810). At this time, for the purpose of informing a user that the storage of an image was completed, the CPU 110 may display, for example, a pop-up screen to this effect, as shown in Fig. 9(5), on the sub display part 104.

As described above, in the past, it was necessary to take the trouble to open a portable telephone and change to the E-mail mode to read the content of a received email, but in this embodiment, by having a user select whether he/she desires to read the content of email or not right after the email was received, the troublesome task of opening the portable telephone can be omitted. Therefore, even when the portable telephone is in the closed state with limited operation keys being available, it is possible to read the content email right after the reception thereof, quickly and by a simple operation, so that the usability is very good.

In addition, since it can be assumed that a user is unaware that mail has been received, the system may be configured such that a screen (Fig. 9(2)) for having a user select whether he/she will read the content of mail right after the mail was received is

deleted after the lapse of predetermined time, and a server is displayed indicating that there was reception of mail. In this way, it is possible to reduce unnecessary electric power consumption.

Also, the system may be configured such that, by opening the portable telephone, after the screen for having a user select whether the user desires to read the content of mail has been displayed, the text of the mail is automatically displayed on the main display part 103. That is, it is possible to use the operation to open a portable telephone as an indication of an intention of a user that the user will read the received mail. In this case, it may be that, in case the opened state is detected by the fold detection part 108, after the CPU 110 has activated the mail function, the body text of a received email is automatically displayed.

Also, in the above-described embodiment, the case of receiving mail with image information attached thereto was considered, but the invention is not limited to this, and the system may be configured to receive mail which does not have image information attached thereto.

In this case, processing regarding attached image information, i.e., processes of S801 to S810, are to be omitted. In addition, Figs. 9(6) to 9(8) show examples of display screens in that case. In this way, even in a case mail with no image information attached was received, it is possible to read the mail content right after reception while the portable telephone is in the closed state.

Next, a fourth embodiment will be described with reference to the flow chart of Fig. 10 and an example of a display screen Fig. 11. Here, an example of this embodiment will be described for a case in which there was reception of a telephone

call while the portable telephone was in the closed state, so that the user can receive the telephone call at ease.

Fig. 10(1) is a view showing an overall system which includes a portable telephone (PORTABLE A) of a user A, a portable telephone (PORTABLE B) of a user B, and a switching machine C. Fig. 10(2) is a process flow chart showing the operations of PORTABLE A in this embodiment, and Fig. 10(3) is a process flow chart showing the operations of the overall system.

For example, in a standby state in which an idle screen as shown in Fig. 11(1) is displayed (S1001), the switching machine C, which has received (S1101) a calling signal that was sent from PORTABLE B, sends a ring signal for establishing a call to PORTABLE A from PORTABLE B (S1102).

The CPU 110 of PORTABLE A, which received the ring signal, analyses the telephone number and so on of PORTABLE B from the ring signal and searches the address book data which is in the non-volatile memory 102b using the telephone number as a search key, and it displays, for example, as shown in Fig. 11(2), name information which corresponds to the search key, on the sub display part 104, and informs the user that there is an incoming call (S1003). Here, in case there is no name information which corresponds to the search key, in the address book data, the CPU 110 displays the telephone number of PORTABLE B.

In Fig. 11(2), the sub operation key 107a functions as a “MESSAGE” key, and the sub operation key 107b functions as a “CUT” key. When a signal from this "CUT" key 107b is inputted to the CPU 110, CPU 110 sends a cut signal to the switching machine C through the communication part 101 to reject reception, and it then returns

to the standby state (S1001) and displays, for example, an idle screen, as shown in Fig. 11(1), on the sub display part 104 (S1004).

Also, when a signal from the "MESSAGE" key 107a is inputted to the CPU 110 (S1005), the CPU 110 sends a reception permission signal to the switching machine C through the communication part 101 (S1103), and connects a telephone call line (S1104). Next, the CPU 110 refers to response message data which was stored in the non-volatile memory 102b and sends a response message of, for example, "Since I will answer soon, please hang on for a while." to PORTABLE B through the communication part 101 and the switching machine C (S1006) (S1105). At this time, in order to inform the user of the sending of a response message to PORTABLE B, the CPU 110 displays, for example, a pop-up screen, to that effect, as shown in Fig. 11(3), on the sub display part 104 to hold the telephone call state (S1106).

In Fig. 11(3), the sub operation key 107b functions as a cut key. When a signal from this cut key 107b is inputted to the CPU 110, the CPU 110 sends a cut signal to the switching machine C through the communication part 101 to end the telephone call and returns to the standby state, and it then displays, for example, an idle screen, as shown in Fig. 11(1), on the sub display part 104 (S1007).

After the response message was sent to PORTABLE B (S1006), PORTABLE A is opened, and when a telephone call start key (Fig. 11(4)) of the main operation key 106 is depressed, a telephone call start instruction signal from the telephone call start key is inputted to the CPU 110 (S1008). At this time, the CPU 110 stops sending the response message and sends the telephone call start instruction signal (S1107), and, at the same time, it activates the microphone 111 and the telephone call speaker 112, and

switches from the telephone call state which was held in step S1006 to a state in which the telephone call is available (S1009) (S1108).

As described above, in case an incoming telephone call is received while the portable telephone is in the closed state, a response message is sent to a calling terminal for now, and after that, without panic, with additional time, a user can start the telephone call with the calling person, so that the usability is good.

Also, since the user can send a response message by a simple operation, such as depressing the sub operation key 107a (message key), it is possible to quickly convey an intention to answer a telephone call to the calling person, and the calling person can wait for the start of the telephone call at ease.

In addition, in case the time which has passed from the sending of a response message to the calling terminal until the start of the telephone call exceed a set time (hereinafter referred to as response elapsed time) which was set in advance, an alert for starting the telephone call may be communicated to the user. In this case, when a signal from the message key 107a is inputted to the CPU 110 (S1005), the CPU 110 activates a timer function and starts counting the elapsed time. After that, it refers to a set time which was stored in advance in the non-volatile memory 102b, and, in case that the elapsed time exceeds the set time, the CPU 110 outputs a sound signal which was stored in advance in the non-volatile memory 102a to a music speaker 113 to alert the user. In this way, for example, even in the case where a user is unaware that he/she has pushed the message key 107a at the time of telephone call reception, since it is possible to urge a user to start telephone call by use of the alert means, such as an alert sound and so on, it is possible to prevent the calling person from being left in a

state of having to wait for an undesirable length of time.

In addition, the alert means is not limited to that considered in the above-described embodiment, but, for example, characters or colors for providing an alert may be displayed on the sub display part 104, and a user is urged to start the telephone call by a combination of alert sounds, characters and color information. Also, the system may be configured to allow a user to select a type of alert sounds and display characters.

Also, in a portable telephone which has an answer phone function for sending a message to a calling person in case the called person can not answer the telephone call, when a response elapse time has exceeded the time for starting activation of the answer phone function (hereinafter, referred to as the answer phone setting time), the answer phone function is automatically activated, and, therefore, it is impossible to start the telephone call. On that account, the system may be configured to stop the answer phone function, in case the message key 107a is depressed.

In this case, when a signal from the message key 107a is inputted to the CPU 110 (S1005), the CPU 110 activates the timer function and starts counting the elapsed time. After that, the CPU 110 is designed to refer to the answer phone setting time, which was stored in advance in the non-volatile memory 102b, and not to carry out processing for sending an answer phone reproduction instruction signal for instructing reproduction of an answer message to the telephone communication line, for example, to an answer phone message service center, even if the response elapsed time has passed the answer phone set time.

In this way, even if the response elapsed time has passed the answer phone set

time, the answer phone function is not activated, and, therefore, a user, without panic, can openthe portable telephone and can carry out an operation for starting the telephone call.

In addition, in the above-described embodiment, the answer phone function itself is stopped in case the response elapsed time has passed the answer phone set time, but it may be configured to automatically extend the answer phone set time.

In this case, when a signal from the message key 107a is inputted to the CPU 110 (S1005), the CPU 110 activates the timer function and starts counting the elapsed time. After that, the CPU 110 proceeds to extend the answer phone set time (e.g., 15 seconds) which was stored in advance in the non-volatile memory 102b to a predetermined preset value (e.g., 30 seconds).

In this way, even if the response elapsed time has passed the answer phone set time, since the answer phone function is not activated for a certain amount of time (here, 30 seconds), a user can open the portable telephone without panic and carry out an operation for starting the telephone call.

In addition, it is needless to say that the system may be configured such that the answer phone set time and the extension preset value which was stored in the non-volatile memory 102b can be changed by a user.

The answer phone message service center, which has received a message reproduction instruction signal, sends a message signal to a calling terminal. The CPU of the calling terminal which received the message signal outputs the message signal to a telephone call speaker and so on, and informs the calling person of the message.

In addition, the above-described embodiment was configured such that, after the

message key 107a has been depressed, in the state in which the portable telephone is open, for example, as shown in Fig. 11(4), the telephone call start key is depressed to start the telephone call (S1009), but since to depress the message key 107a is also an indication of an intention that the user will answer the call later, to depress the telephone call start key again when the portable telephone is in the open state becomes a duplicate troublesome task. In this connection, the system may be configured such that, after the message key 107a is depressed in the closed state, if the portable telephone is opened, the telephone call is automatically started.

On the other hand, if the portable telephone is left in the open state, the open and closed state information which was stored in the volatile memory 102a is changed from the closed state "1" to the open state "0", and the CPU 110 which recognizes that change, stops the sending of a response message, activates the microphone 111 and the telephone call speaker 112, and carries out processing for restarting the telephone call state which was held in steps S1006.

In this way, since the need for taking the trouble to depress the telephone call start key can be omitted, the usability is good.

Also, the system maybe configured such that the telephone communication network, for example, the switching machine sends the response message which was sent in step S1006. In this case, in the standby state (S1001) in which, an idle screen, for example, as shown in Fig. 11(1), is displayed, the switching machine C, which received (S1201) a calling signal which was sent from PORTABLE B, sends a ring signal for calling to PORTABLE A (S1202).

The CPU 110 of PORTABLE A, which received the ring signal, analyses the

telephone number and so on of PORTABLE B from the ring signal, searches the address book data which is stored in the non-volatile memory 102b using the telephone number as a search key, and displays, for example, as shown in Fig. 11(2), name information which corresponds to the search key, on the sub display part 104, so as to inform the user that there is an incoming call (S1003). Here, in case there is no name information which corresponds to the search key in the address book data, the CPU 110 displays the telephone number of the PORTABLE B.

In Fig. 11(2), the sub operation key 107a functions as a "MESSAGE" key, and the sub operation key 107b functions as a "CUT" key. When a signal from this "CUT" key 107b is inputted to the CPU 110, CPU 110 sends a cut signal to the switching machine C through the communication part 101 to reject reception, and it then returns to the standby state (S1001) and displays, for example, an idle screen, as shown in Fig. 11(1), on the sub display part 104 (S1004).

Also, when a signal from the "MESSAGE" key 107a is inputted to the CPU 110 (S1005), the CPU 110 sends a response message start signal to the switching machine C through the communication part 101 (S1104)(S1203). Next, the switching machine C sends a response message of, for example, "Since I will answer soon, please hang on for awhile." to PORTABLE B through the communication part 101 and the switching machine C (S1006) (S1204). At this time, in order to inform the user of the sending of a response message to PORTABLE B, the CPU 110 displays, for example, a pop-up screen to that effect, as shown in Fig. 11(3), on the sub display part 104. At this time, communication may be or may not be established between PORTABLE A and PORTABLE B, but since a wireless resource is finite, the use efficiency of the wireless

resource is better in case communication is not established between PORTABLE A and PORTABLE B.

In Fig. 11(3), the sub operation key 107b functions as a cut key. When a signal from this cut key 107b is inputted to the CPU 110, the CPU 110 sends a cut signal to the switching machine C through the communication part 101 to end the sending of the response message from the switching machine C to PORTABLE B, and PORTABLE A returns to the standby state, and it then displays, for example, an idle screen, as shown in Fig. 11(1), on the sub display part 104 (S1007).

After the response message start signal was sent to the switching machine C (S1203), PORTABLE A is opened, and when the telephone call start key (Fig. 11(4)) of the main operation key 106 is depressed, a telephone call start instruction signal from the telephone call start key is inputted to the CPU 110 (S1008). At this time, the CPU 110 sends the telephone call start instruction signal to the switching machine C (S1205), establishes a communication connection with PORTABLE B (S1206), and, at the same time, it activates the microphone 111 and a telephone call speaker 112, and sets a state in which a telephone call is available (S1009)(S1207).

By the foregoing, since the switching machine is configured to send the response message, the burden of providing memory space and processing in the portable telephone for this purpose is reduced.

As described above, mail reception and telephone call reception in the closed state was considered, but it is needless to say that the key layout, the display screen and so on are not limited to those described with reference to this embodiment. Also, as to the point that a message is displayed at the time of mail reception, and on the basis

of that message, browsing of the mail is inquired, and as to a point that, on the basis of a result of that inquiry, a body text of mail is automatically displayed, it is needless to say that such features are applicable not only to a fold type portable telephone, but also to other types of portable telephone.

Also, in the embodiments which have been described so far, as a method of returning to a previous screen of the display screen which is being displayed on the sub display part 104, for example, the "RETURN" function was assigned to any one of the sub operation keys 107a and 107b, but the system may be configured such that a "RETURN" exclusive use operation key is separately disposed at a place where it can be operated even in a case where the portable telephone is closed, and by depressing that key, the display returns to the previous screen.

Also, in the foregoing embodiments, as a display part, a liquid crystal panel has been considered, but the invention is not limited to this, and for example, the display part may consist of a light emitting device, such as an organic EL and so on.

Also, the invention is not limited to the embodiments which were described above, and a principle and a new characteristic which were disclosed here include a broad range of technical scope.

As described above, according to this invention, when the portable telephone is in the folded state, the usability in a folded state can be improved. In particular, it is possible to improve the usability at the time of camera operation.

Also, according to another aspect of the invention, it is possible to prevent a wrong operation of an operation key which is formed on a back surface of the portable telephone.

Also, according to still another aspect of the invention, it is possible to prevent a malfunction of an operation key which is formed on a back surface of the portable telephone.